

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

an input ~~means unit~~ for inputting loan amounts loaned to each said loan customer and bankruptcy probabilities of each said loan customer;

a characteristic function calculating ~~means unit~~ for calculating a characteristic function on the basis of each said loan amount and each said bankruptcy probability inputted through said input ~~means unit~~;

a probability distribution calculating ~~means unit~~ for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating ~~means unit~~; and

a probability distribution output ~~means unit~~ for outputting said probability distribution calculated by said probability distribution calculating ~~means unit~~.

2. (Currently Amended) The system for computing probability distribution of loan losses according to claim 1 wherein said probability distribution calculating ~~means unit~~ uses fast Fourier transform technique for said Fourier transform inversion.

3. (Currently Amended) The system for computing probability distribution of loan losses according to claim 1 further comprising a loan amount rounding ~~means unit~~ for rounding each said loan amount inputted through said input ~~means unit~~ to a number which is an integer multiple of a predetermined unit.

4. (Currently Amended) The system for computing probability distribution of loan losses according to claim 1 wherein said probability distribution output ~~means unit~~

outputs a graph grading probability densities on its ordinate and loan losses on its abscissa, the maximum value on the abscissa of said graph being the sum of said loan amounts.

5. (Currently Amended) The system for computing probability distribution of loan losses according to claim 1 wherein said probability distribution output ~~means unit~~ outputs a graph grading probability densities on its ordinate and loan losses on its abscissa, the maximum value on the abscissa of said graph being a loan loss over which probability of occurrence can be regarded substantially zero in the calculating process.

6. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

an acquiring ~~means unit~~ for acquiring rating fluctuation probabilities which are the probabilities of fluctuation in ratings of each said loan customer, and credit value changing amount which are changes in value of the credit to each said loan customer caused by the fluctuation in the ratings thereof;

a characteristic function calculating ~~means unit~~ for calculating a characteristic function on the basis of each said rating fluctuation probability and each said credit value changing amount;

a probability distribution calculating ~~means unit~~ for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating ~~means unit~~; and

a probability distribution output ~~means unit~~ for outputting said probability distribution calculated by said probability distribution calculating ~~means unit~~.

7. (Currently Amended) The system for computing probability distribution of loan losses according to claim 6 wherein said acquiring ~~means unit~~ includes:

an input ~~means unit~~ for inputting loan amounts loaned to each said loan customers and loss ratios caused by fluctuations in rating of each said loan customers; and

a changing amount calculating ~~means unit~~ for calculating said credit value changing amount of each said loan customer from each said loan amount and each said loss ratio.

8. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

an input ~~means unit~~ for inputting loan amounts loaned to each said loan customer and bankruptcy probabilities of each said loan customer;

a actual loss calculating ~~means unit~~ for calculating actual losses which are amounts of the losses said financing organization ~~may substantially suffer~~ suffers when each said loan customer goes into bankruptcy;

a characteristic function calculating ~~means unit~~ for calculating a characteristic function on the basis of said actual losses and said bankruptcy probabilities;

a probability distribution calculating ~~means unit~~ for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating ~~means unit~~; and

a probability distribution output ~~means unit~~ for outputting said probability distribution calculated by said probability distribution calculating ~~means unit~~.

9. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

a scenario acquiring ~~means unit~~ for acquiring a plurality of actual losses which are amounts of losses said financing organization ~~may suffer~~ suffers when each said loan customer goes into bankruptcy by predicting future fluctuations, and a plurality of bankruptcy probabilities of each said loan customer by predicting future fluctuations, and using these values as a plurality of scenarios;

a characteristic function calculating ~~means unit~~ for calculating characteristic functions for each said scenario on the basis of said actual losses and said bankruptcy probabilities acquired by said scenario acquiring ~~means unit~~;

a probability distribution calculating ~~means unit~~ for calculating probability distributions for each said scenario by Fourier transform inversion of said characteristic functions calculated by said characteristic function calculating ~~means unit~~;

an average probability distribution calculating ~~means unit~~ for calculating an average probability distribution which is the average of said probability distributions for each said scenario; and

a probability distribution output ~~means unit~~ for outputting said average probability distribution calculated by said average probability distribution calculating ~~means unit~~.

10. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

a scenario acquiring ~~means unit~~ for acquiring a plurality of actual losses which are amounts of losses said financing organization may suffer ~~may suffer suffers~~ when each said loan customer goes into bankruptcy by predicting future fluctuations, and a plurality of bankruptcy probabilities of each said loan customer by predicting future fluctuations, and using these values as a plurality of scenarios;

a characteristic function calculating ~~means unit~~ for calculating characteristic functions for each said scenario on the basis of said plurality of actual losses and bankruptcy probabilities acquired by said scenario acquiring ~~means unit~~;

a probability distribution calculating ~~means unit~~ for calculating probability distributions for each said scenario by Fourier transform inversion of said characteristic functions calculated by said characteristic function calculating ~~means unit~~; and

a probability distribution output ~~means unit~~ for outputting said probability distributions calculated by said probability distribution calculating ~~means unit~~ for each said scenario.

11. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

a scenario acquiring means unit for acquiring loan amounts of each loan customer and acquiring a plurality of bankruptcy probabilities of each said loan customer by predicting future fluctuations, and then using these values as a plurality of scenarios;

a characteristic function calculating means unit for calculating characteristic functions for each said scenario on the basis of said loan amounts and said bankruptcy probabilities acquired by said scenario acquiring means unit;

a probability distribution calculating means unit for calculating probability distributions for each said scenario by Fourier transform inversion of said characteristic functions calculated by said characteristic function calculating means unit;

an average probability distribution calculating means unit for calculating an average probability distribution which is the average of said probability distributions for each said scenario; and

a probability distribution output means unit for outputting said average probability distribution calculated by said average probability distribution calculating means unit.

12. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

a scenario acquiring means unit for acquiring loan amounts of each loan customer and acquiring a plurality of bankruptcy probabilities of each said loan customer by predicting future fluctuations, and then using these values as a plurality of scenarios;

a characteristic function calculating means unit for calculating characteristic functions for each said scenario on the basis of said loan amounts and said bankruptcy probabilities acquired by said scenario acquiring means unit;

a probability distribution calculating means unit for calculating probability distributions for each said scenario by Fourier transform inversion of said characteristic functions calculated by said characteristic function calculating means unit; and

a probability distribution output means unit for outputting said probability distributions calculated by said probability distribution calculating means unit for each said scenario.

13. (Currently Amended) The system for computing probability distribution according to claim 11 wherein said scenario acquiring ~~means~~ unit expresses probabilities of bankruptcy of said loan customers by a function, and acquires said plurality of bankruptcy probabilities according to said function.

14. (Original) The system for computing probability distribution according to claim 13 wherein said function expressing probabilities of said loan customers is

$$\text{Norm} \left[Y_k - \sum_{r=1}^R a_{kr} u_r \right]$$

where k indicates each loan customer, u_r are random variables according to an R-dimensional normal distribution, and a_{kr} are constants.

15. (Original) The system for computing probability distribution according to claim 13 wherein said function expressing probabilities of said loan customers is

$$\text{Norm}(Y_k - a_k u)$$

where k indicates each loan customer, u is a random variable, and a_k is a constant.

16. (Currently Amended) A computer based system for computing probability distribution of loan losses in a financing organization having N loan customers $k=1 \dots N$ comprising:

an input ~~means~~ unit for inputting loan amounts M_k to each said N loan customers $k=1 \dots N$ and bankruptcy probabilities p_k thereof;

a loan customer calculating ~~means~~ unit for calculating the number N of said loan customers on the basis of said loan amounts M_k and/or said bankruptcy probabilities p_k inputted by said input ~~means~~ unit;

a characteristic function calculating means unit for calculating a characteristic function

$$\phi(t) = \prod_{k=1}^N \{1 + p_k(\exp(itM_k) - 1)\}$$

at each t of $t=2\pi m/(2^{2n})$ ($m=0, 1, 2, \dots, 2^{2n}-1$) for the number of points n of Fourier transform;

a probability distribution calculating means unit for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating means unit, by using a fast Fourier transform technique; and

a probability distribution output means unit for outputting said probability distribution calculated by said probability distribution calculating means unit.

17. (Currently Amended) The system for computing probability distribution according to claim 16 wherein $2^{2n}-1$ which is the greatest value of m in said characteristic function calculating means unit is a value not less than the sum of all loan amounts.

18. (Currently Amended) The system for computing probability distribution according to claim 16 wherein $2^{2n}-1$ which is the greatest value of m in said characteristic function calculating means unit is a value not less than the minimum of values for which probability of loan losses can be regarded substantially zero in the calculation process.

19. (Currently Amended) The system for computing probability distribution according to claim 16 further comprising a loan amount rounding means unit for rounding each said loan amount inputted through said input means unit to a number integer times of a predetermined unit, and

$2^{2n}-1$ which is the greatest value of m in said characteristic function calculating means unit being a value not less than the quotient obtained by dividing the sum of all loan amounts by said predetermined unit.

20. (Currently Amended) The system for computing probability distribution according to claim 16 further comprising a loan amount rounding ~~means~~ unit for rounding each said loan amount inputted through said input ~~means~~ unit to a number integer times of a predetermined unit, and

$2^{2^n}-1$ which is the greatest value of m in said characteristic function calculating ~~means~~ unit being a value not less than the quotient obtained by dividing by said predetermined unit the minimum of values for which probability of loan losses can be regarded substantially zero in the calculation process.

21. (Previously Presented) A computer implemented method for computing probability distribution of loan losses in a financing organization having a plurality of loan customers, comprising:

an input process for inputting loan amounts loaned to each said loan customer and bankruptcy probabilities of each said loan customer;

a computer implemented characteristic function calculating process for calculating a characteristic function on the basis of said loan losses and said bankruptcy probabilities;

a computer implemented probability distribution calculating process for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating process; and

a probability distribution output process for outputting said probability distribution calculated by said probability distribution calculating process.

22. (Previously Presented) A computer readable medium storing a program that, when executed, causes a computer system to calculate a probability distribution of loan losses in a financing organization having a plurality of loan customers, said program comprising:

an input process, implemented by said program, for inputting loan amounts loaned to each said loan customer and bankruptcy probabilities of each said loan customer;

a characteristic function calculating process, implemented by said program, for calculating a characteristic function on the basis of said loan losses and said bankruptcy probabilities;

a probability distribution calculating process, implemented by said program, for calculating a probability distribution by Fourier transform inversion of said characteristic function calculated by said characteristic function calculating process; and

a probability distribution output process, implemented by said program, for outputting said probability distribution calculated by said probability distribution calculating process.